

p. c. 1.

MR. BRODHURST'S VIEW 4

OF THE

CAUSE OF ROTATION

IN

LATERAL CURVATURE OF THE SPINE.

BY

A. B. JUDSON, M.D.,

ORTHOPEDIC SURGEON TO THE OUT-PATIENT DEPARTMENT OF THE NEW YORK
HOSPITAL.

Reprinted from THE MEDICAL RECORD, January 19, 1884.

NEW YORK:
TROW'S PRINTING AND BOOKBINDING CO.,
201-213 EAST TWELFTH STREET.
1884.



MR. BRODHURST'S VIEW
OF THE
CAUSE OF ROTATION
IN
LATERAL CURVATURE OF THE SPINE.

BY
A. B. JUDSON, M.D.,
ORTHOPEDIC SURGEON TO THE OUT-PATIENT DEPARTMENT OF THE NEW YORK
HOSPITAL.

Reprinted from THE MEDICAL RECORD, January 19, 1884.

NEW YORK:
TROW'S PRINTING AND BOOKBINDING CO.,
201-213 EAST TWELFTH STREET.
1884.





MR. BRODHURST'S VIEW OF THE CAUSE OF
ROTATION IN LATERAL CURVATURE
OF THE SPINE.

In the third edition of his valuable work on curvatures of the spine Mr. Brodhurst has advanced a theory of the cause of rotation which fails to throw additional light on this feature of lateral curvature. The following passage presents his view :

“ So soon as spinal curvature commences the axis of the trunk is changed, and the column is no longer poised in the vertical line on the heads of the thigh-bones. The superincumbent weight being no longer transmitted in the normal axis of the trunk, but falling on the side of the concavity of the primary curve, unequal pressure causes first compression of the intervertebral substances which enter into the curve. After a variable time this compressed condition of the intervertebral substance continues more or less, and is not removed by ordinary recumbency. The body of the vertebra then begins to move laterally, through the pressure on the inner, or concave side of the curve, and in consequence of pressure being removed from the convexity. And through this compression on the side of the concavity, a gliding, or *rotating* (lateral) movement of the bodies with the intervertebral substances is established. This compression acts first on the intervertebral substance, and secondly on the body of the vertebra ; and causes thinning and lateral displacement, or *rotation* (curvature). *Rotation* (Curvature), then, is immediately due to abnormally increased pressure on

the concave side of the spinal curve, and to removal of pressure from the convexity.”¹

I have ventured to *Italicize* certain words in the above passage and to insert other words parenthetically, in order to show that by omitting the words in *Italics* and substituting those in parentheses the passage becomes an exposition of the mechanics of simple curvature without rotation. It thus appears that the above explanation of the cause of rotation is essentially an explanation of the mechanics of lateral curvature with the question of rotation omitted.

If, however, to the above passage, altered as indicated, we append the statement that the motion of the bodies of the vertebræ is greater than that of the spinous processes, because the processes are embarrassed in the parietes while the bodies are further displaced laterally in the cavity of the trunk, this movement constituting rotation, as proposed by me in 1876, we have at once a statement of the mechanics of lateral curvature and an exposition of rotation on grounds which are correct and scientific.

Before my attention was called to the fact by Mr. E. Noble Smith² I was not aware that this method of explaining the cause of rotation had been employed by Mr. Rogers-Harrison in 1842. His words are as follows : “To conceive the cause of this extraordinary mode of derangement it is necessary to imagine that in a well-marked curvature of the spinal column continuing to sustain the weight of the body, the vertebræ of the middle of that curvature are, in fact, in the same situation as if they were urged by a direct and horizontal force on the side of the concavity, towards that of the convexity. In this impulsions the body of the vertebra, isolated in its anterior and lateral parts, experiences no resistance ; but the articular processes are powerfully restrained by their

¹ On Curvatures and Disease of the Spine. By Bernard E. Brodhurst. Third edition, p. 39. London, 1883.

² London Medical Record, December 15, 1882, pp. 493, 494.

reciprocal connection. The transverse processes find in their articulation with the tuberosities of the ribs a resistance to their deviation, which would be very weak on the part of an isolated rib, but which becomes considerable by its union with the adjoining ribs. It results from this exposition, that, behind the central part of the dorsal column, there is efficacious resistance to its lateral displacement; that before this central part there is no resistance to that displacement; and consequently the vertebra must necessarily turn on its axis to arrive at the position which observation so frequently presents."¹

It is worthy of remark that Mr. Rogers-Harrison was opposed to the treatment of lateral curvature by mechanical support applied to the ribs. Dr. Dods, who appears to have been the first to observe rotation, was also opposed to this form of treatment. The latter writes as follows: "I must here caution those who shall treat contorted patients in the manner I have recommended by no means to make pressure upon the protruding ribs, with the view of replacing them; for, if they attempt to do so, they will be more likely to increase the rotation, particularly of the lumbar² vertebræ than diminish it."³ There is wisdom in this precept, because lateral pressure on the ribs would be equivalent to lateral pressure applied to the processes of the vertebral column, which, if it did not increase the rotation, would at least stand in the way of its reduction. If lateral pressure could be applied directly to the bodies of the vertebræ the problem of mechanical treatment would indeed be simplified, because pressure thus applied would oppose at once the lateral curvature and the rotation.

In the passage above quoted from his book Mr. Rogers-Harrison gave the true explanation of the cause of rota-

¹ Deformities of the Spine and Chest. By Charles H. Rogers-Harrison, pp. 93, 94. London, 1842. Library of the Surgeon-General's Office, Washington.

² Dorsal?

³ The Rotated or Contorted Spine. By Andrew Dods, M.D., pp. 226, 227. London, 1824. Library Surgeon-General's Office.

tion in lateral curvature of the spine, an explanation which cancels and destroys all the other theories which have been proposed. That of Professor Herman Meyer is especially ingenious and fortified by elaborate experiments. It is, however, quite different from the view presented by Mr. Rogers-Harrison in 1842, and myself at a later date. It is true that I was familiar with Professor Meyer's theory,¹ but it can hardly be supposed that the view presented by me and the method which I employed for its illustration were suggested by his work. In the paper referred to I present Professor Meyer's conclusions and give a reason for doubting their correctness in the following words: "Professor Meyer discovered that the anterior portion of the spinal column possessed great expansibility, and the posterior portion great compressibility, and inferred that, when the lateral curvature took place, the posterior portion of the column would seek the concavity and the anterior portion the convexity of the curve." "Considering the proportionate length and thickness of the spinal column, the rotation which its bodies perform is too short and sharp, and decided to be produced . . . by the different endowments of its anterior and posterior portions as to the physical qualities of compressibility and expansibility."²

Professor Meyer's paper³ makes no reference to the fact that the posterior part of the column has less lateral displacement by reason of its being a part of the parietes than the anterior part which projects into the cavity of the trunk. This difference in the anatomical relations of the two parts is the key to the problem which has confused so many observers. A recent German writer, apparently made desperate by the conflicting theories which the study of this question has occasioned, denies the very existence of rotation. He says there is no rota-

¹ Brodhurst, op. cit., pp. 37, 38.

² Transactions New York Academy of Medicine, 1876, pp. 317, 328, 329.

³ Die Mechanik der Skoliose. Professor G. Hermann Meyer in Zürich, Arch. klin. Med., xxxv., 1866, pp. 225-253.

tion, only the appearance of it. The too-long-forgotten theory of Mr. Rogers-Harrison renders easy the recognition of rotation and fully explains its mechanism.

It is well to separate the question of the cause of rotation from the more important and difficult question, the cause of lateral curvature. The logical and practical view of these questions is that in which rotation is considered as a feature of the ordinary forms of lateral curvature, whatever may be their cause. That the two questions are clearly distinct is obvious from the fact that rotation occurs in health as well as in disease. It is not only pathological, an incident of disease and deformity, but also physiological, a feature of the normal lateral curving of the spine. Mr. Brodhurst¹ has observed and well described the appearance of rotation in health, as it varies from right to left with each step of locomotion, together with the lateral undulating movement of the spine from the pelvis to the head. He adds that these phenomena may be studied with advantage in young acrobats, in whom exaggerated positions of the trunk and limbs will display these movements of the vertebræ.

¹ Op. cit., pp. 30, 31.

